

## Claims

- [c1] 1. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:
- a thin-body flange configured to be abuttingly installed upon an end surface of a receiving carburetor in which a combustion air intake is located;
  - a combustion air aperture extending through said thin-body flange, said combustion air aperture being located in said thin-body flange for alignment with the combustion air intake of the receiving carburetor for establishing fluid communication therebetween when said thin-body flange is abuttingly installed thereupon;
  - a scavenging air aperture extending through said thin-body flange, said scavenging air aperture being located in said thin-body flange and spaced apart from said combustion air aperture; and
  - a valve assembly operatively coupled to said thin-body flange and having a valve element positioned at said scavenging air aperture for opening and closing said scavenging air aperture.
- [c2] 2. The flange assembly as recited in claim 1, wherein said thin-body flange is of one-piece, predominantly flat and rigid construction thereby affecting precision-location of said scavenging air aperture relative to said combustion air aperture and also facilitating precision-placement of said scavenging air aperture with respect to the receiving carburetor when said thin-body flange is installed thereupon.
- [c3] 3. The flange assembly as recited in claim 1, further comprising:
- fastener accommodating apertures extending through said thin-body flange and located to align with assembly screw receivers in the receiving carburetor when said thin-body flange is installed thereupon thereby facilitating precision-placement of said scavenging air aperture with respect to the receiving carburetor when said thin-body flange is installed thereupon.
- [c4] 4. The flange assembly as recited in claim 1, further comprising:
- fastener accommodating apertures extending through said thin-body flange

and located to be offset from assembly screw receivers in the receiving carburetor when said thin-body flange is installed thereupon.

- [c5] 5. The flange assembly as recited in claim 1, further comprising:  
said scavenging air aperture being oblong in shape through said thin-body flange for establishing an inlet to a multi-branch manifold when said flange assembly is installed on a receiving carburetor and included on an internal combustion engine.
- [c6] 6. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:  
a thin-body flange configured to be abuttingly installed upon an end surface of a receiving carburetor in which a combustion air intake is located, said thin-body flange having thickness, length and width dimensions;  
a combustion air aperture and a scavenging air aperture each extending through said thin-body flange and across said thickness dimension and spaced apart, one aperture from the other; and  
a valve assembly operatively coupled to said thin-body flange and having a valve element positioned at said scavenging air aperture for opening and closing said scavenging air aperture.
- [c7] 7. The flange assembly as recited in claim 6, further comprising:  
said length and said width dimensions of said thin-body flange are greater than said thickness dimension; and  
said combustion air aperture and said scavenging air aperture each has a longitudinal axis extending substantially perpendicular to a longitudinal axis of said thin-body flange.
- [c8] 8. The flange assembly as recited in claim 6, further comprising:  
an axel of said valve assembly being positioned at said scavenging air aperture on said thin-body flange for associating a valve element with said scavenging air aperture.
- [c9] 9. The flange assembly as recited in claim 6, wherein said thin-body flange is

configured to substantially cover an end surface of the receiving carburetor when said thin-body flange is installed thereupon.

[c10] 10. The flange assembly as recited in claim 6, further comprising:  
an axel for a valve element of a butterfly valve, said axel extending across said scavenging air aperture and being rotatably supported in axel apertures in said thin-body flange.

[c11] 11. The flange assembly as recited in claim 6, further comprising:  
a pivot hinge receiver, said pivot hinge receiver positioned adjacent to said scavenging air aperture on said thin-body flange for associating a flapper-type valve element with said scavenging air aperture.

[c12] 12. The flange assembly as recited in claim 6, wherein among the dimensions of said thin-body flange, said length dimension is greater than said width dimension, and said width dimension is greater than said thickness dimension.

[c13] 13. The flange assembly as recited in claim 6, further comprising:  
said valve element being rotatably coupled to said thin-body flange and being constructed at least partially from a buffering material that is softer than the construction material of said thin-body flange thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in a closed configuration.

[c14] 14. The flange assembly as recited in claim 6, further comprising:  
said valve element being rotatably coupled to said thin-body flange; and  
a buffering component positioned between said valve element and said thin-body flange in a closed configuration of said valve element, said buffering component constructed from material softer than material used in construction of said valve element thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in the closed configuration.

[c15] 15. The flange assembly as recited in claim 14, wherein said buffering component is a lip formed substantially about a perimeter of said valve element.

- [c16] 16. The flange assembly as recited in claim 14, wherein said buffering component is a liner positioned at least partially within said thin-body flange and having a surface portion exposed to said valve element for engagement therewith in said closed configuration.
- [c17] 17. The flange assembly as recited in claim 6, further comprising: at least one pivot hinge receiver, a leveraging extension and a flapper-type valve element, said pivot hinge receiver positioned on said thin-body flange remotely away from said scavenging air aperture at least as far away as said combustion air aperture, and together with said leveraging extension, positioning said flapper-type valve element to open and close said scavenging air aperture.
- [c18] 18. The flange assembly as recited in claim 17, wherein said at least one pivot hinge receiver includes a plurality of pivot hinge receivers, each of said plurality of pivot hinge receivers being positioned on said thin-body flange on an opposite side of said combustion air aperture away from said scavenging air aperture for associating a flapper-type valve element supported on a leveraging extension with said scavenging air aperture.
- [c19] 19. The flange assembly as recited in claim 18, further comprising: a plurality of leveraging extensions, each leveraging extension being coupled to said thin-body flange by a respective pivot hinge; and said flapper-type valve element being attached to each leveraging extension at a remote position from a respective pivot hinge.
- [c20] 20. The flange assembly as recited in claim 6, wherein said scavenging air aperture and said combustion air aperture are positioned one above the other when said thin-body flange is abuttingly installed upon the receiving carburetor.
- [c21] 21. The flange assembly as recited in claim 20, wherein said scavenging air aperture is positioned above said combustion air aperture when said thin-body flange is abuttingly installed upon the receiving carburetor.
- [c22] 22. The flange assembly as recited in claim 20, wherein said scavenging air

aperture is positioned below said combustion air aperture when said thin-body flange is abuttingly installed upon the receiving carburetor.

[c23] 23. The flange assembly as recited in claim 6, wherein said thin-body flange is constructed so that a predominant portion thereof forms a substantially flat plate.

[c24] 24. The flange assembly as recited in claim 23, wherein a carburetor-side surface of said thin-body flange is substantially planar for accommodating face-to-face engagement with the end surface of the receiving carburetor when said thin-body flange is installed thereupon.

[c25] 25. The flange assembly as recited in claim 24, wherein an outwardly directed surface of said thin-body flange opposite to said carburetor-side surface of thin-body flange is substantially planar and parallel to said carburetor-side surface of said thin-body flange.

[c26] 26. The flange assembly as recited in claim 24, wherein a predominant portion of an outwardly directed surface of said thin-body flange is substantially planar and parallel in orientation to said carburetor-side surface of said thin-body flange.

[c27] 27. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:  
a thin-body flange configured to be installed upon a carburetor;  
a scavenging air aperture extending through said thin-body flange;  
a valve element rotatably coupled to said thin-body flange and configured to open and to close said scavenging air aperture; and  
a buffering component positioned between said valve element and said thin-body flange in a closed configuration of said valve element, said buffering component constructed of material softer than said valve element's material of construction thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in a closed configuration.

- [c28] 28. The flange assembly as recited in claim 27, wherein said buffering component is a lip engaged substantially about a perimeter of said valve element.
- [c29] 29. The flange assembly as recited in claim 27, wherein said buffering component is formed as a liner positioned at least partially within said thin-body flange and having a surface portion exposed to said valve element for engagement therewith in said closed configuration.
- [c30] 30. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:  
a thin-body flange configured to be installed upon a carburetor;  
a scavenging air aperture extending through said thin-body flange; and  
a valve element rotatably coupled to said thin-body flange and configured to open and to close said scavenging air aperture, said valve element being constructed at least partially from a buffering material that is softer than material of said thin-body flange's construction thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in a closed configuration.
- [c31] 31. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:  
a thin-body flange configured to be installed upon a receiving carburetor designed to be associated with an internal combustion engine;  
a scavenging air aperture extending through said thin-body flange, said scavenging air aperture being located in said thin-body flange so that said scavenging air aperture is spaced at a distance from the receiving carburetor;  
and  
a valve assembly operatively coupled to said thin-body flange and having a valve element positioned at said scavenging air aperture for opening and closing said scavenging air aperture.
- [c32] 32. The flange assembly as recited in claim 31, wherein said thin-body flange is

of one-piece, predominantly flat and rigid construction thereby affecting precision-location of said scavenging air aperture relative to the receiving carburetor when said thin-body flange is installed thereupon.

[c33] 33. The flange assembly as recited in claim 31, further comprising:  
said thin-body flange being of one-piece construction and comprising two offset planar portions connected by a transitional portion, each of said two planar portions having exposed side surfaces on the same side of said thin-body flange; and  
said two exposed side surfaces of said two planar portions being substantially parallel, one to the other, and offset, one from the other in different planes.

[c34] 34. The flange assembly as recited in claim 31, further comprising:  
fastener accommodating apertures extending through said thin-body flange and located to align with assembly screw receivers in the receiving carburetor when said thin-body flange is installed thereupon thereby facilitating precision-placement of said scavenging air aperture with respect to the receiving carburetor when said thin-body flange is installed thereupon.

[c35] 35. The flange assembly as recited in claim 34, wherein said thin-body flange is of one-piece, predominantly flat and rigid construction thereby affecting precision-location of said scavenging air aperture relative to said fastener accommodating apertures extending through said thin-body flange.

[c36] 36. The flange assembly as recited in claim 31, further comprising:  
said scavenging air aperture being oblong in shape through said thin-body flange for establishing an inlet to a multi-branch manifold when said flange assembly is installed on a receiving carburetor and included on an internal combustion engine.

[c37] 37. The flange assembly as recited in claim 31, further comprising:  
said thin-body flange having a thickness, a length and a width;  
said length and said width of said thin-body flange being greater than said thickness; and  
said scavenging air aperture extending through said thin-body flange and

across said thickness thereof in a direction substantially perpendicular to a longitudinal axis of said thin-body flange thereby causing air flow through said scavenging air aperture to be substantially parallel with air flow through a combustion air channel of the receiving carburetor.

[c38] 38. The flange assembly as recited in claim 37, further comprising:  
an axel of said valve assembly being positioned at said scavenging air aperture on said thin-body flange for associating a valve element with said scavenging air aperture.

[c39] 39. The flange assembly as recited in claim 37, further comprising:  
an axel for a valve element of a butterfly valve, said axel extending across said scavenging air aperture and being rotatably supported in axel apertures in said thin-body flange.

[c40] 40. The flange assembly as recited in claim 37, further comprising:  
a pivot hinge receiver, said pivot hinge receiver positioned adjacent to said scavenging air aperture on said thin-body flange for associating a flapper-type valve element with said scavenging air aperture.

[c41] 41. The flange assembly as recited in claim 37, wherein among the dimensions of said thin-body flange, said length dimension is greater than said width dimension, and said width dimension is greater than said thickness dimension.

[c42] 42. The flange assembly as recited in claim 37, further comprising:  
said valve element being rotatably coupled to said thin-body flange and being constructed at least partially from a buffering material that is softer than the construction material of said thin-body flange thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in a closed configuration.

[c43] 43. The flange assembly as recited in claim 37, further comprising:  
said valve element being rotatably coupled to said thin-body flange; and  
a buffering component positioned between said valve element and said thin-body flange in a closed configuration of said valve element, said buffering component constructed from material softer than material used in construction



of said valve element thereby facilitating a seal between said valve element and said thin-body flange when said valve element is positioned in the closed configuration.

- [c44] 44. A flange assembly for supporting a scavenging air supply to an internal combustion engine at a carburetor associated with the engine, said flange assembly comprising:
- a scavenging air transfer member configured to be installed upon a side surface of a receiving carburetor designed to be associated with an internal combustion engine;
  - a scavenging air channel extending through said scavenging air transfer member, said scavenging air channel being located in said scavenging air transfer member so that said scavenging air channel is precision-positioned with respect to the receiving carburetor;
  - a valve assembly operatively coupled to said scavenging air transfer member and having a valve element positioned at said scavenging air channel for opening and closing said scavenging air channel; and
  - said scavenging air channel having a longitudinal axis extending through said scavenging air transfer member so that air flow through said scavenging air channel is substantially parallel with air flow through a combustion air channel of the receiving carburetor.
- [c45] 45. The flange assembly as recited in claim 44, further comprising:
- an axel of said valve assembly being positioned at said scavenging air aperture on said scavenging air transfer member for associating said valve element with said scavenging air channel.
- [c46] 46. The flange assembly as recited in claim 44, wherein said scavenging air transfer member is of one-piece construction thereby affecting precision-location of said scavenging air channel relative to the receiving carburetor when said scavenging air transfer member is installed thereupon.
- [c47] 47. The flange assembly as recited in claim 44, further comprising:
- said scavenging air transfer member being of one-piece construction and comprising two offset exposed side surfaces connected by a transitional

portion, each of said two offset exposed side surfaces being on the same side of said scavenging air transfer member.

- [c48] 48. The flange assembly as recited in claim 47, further comprising:  
said two offset exposed side surfaces being substantially parallel, one to the other, and positioned one from the other in different planes.